

## WHAT IS CLAIMED IS:

1. A magnetic recording medium comprising a non-magnetic substrate, a non-magnetic undercoat layer, a magnetic layer, and a protective film, the layers and film being successively formed on the substrate, wherein the non-magnetic undercoat layer has a multi-layer structure formed of at least two layers and contains a layer A formed of a material selected from the group consisting of a Cr-Ta-based alloy, a Cr-Nb-based alloy, a Cr-Ti-based alloy, a Cr-Zr-based alloy, and a Cr-Hf-based alloy, and a layer B formed of a material selected from the group consisting of a Co-W-based alloy, a Co-W-B-based alloy, a Co-Mo-based alloy, a Co-Mo-B-based alloy, a Co-W-Mo-based alloy, and a Co-W-Mo-B-based alloy, in which the layers A and B are provided in this order from the non-magnetic substrate.

2. A magnetic recording medium according to claim 1, wherein the non-magnetic undercoat layer contains, on the side of the layer B that is close to the magnetic layer, a layer C which is a Cr layer or a Cr alloy layer formed of Cr and at least one element selected from among Ti, Mo, Al, Ta, W, Ni, B, Si, and V.

3. A magnetic recording medium according to claim 1 or 2, wherein the Cr-Ta-based alloy has a Ta content falling within a range of 25 at% to 50 at%.

4. A magnetic recording medium according to claim 1 or 2, wherein the Cr-Nb-based alloy has an Nb content falling within a range of 25 at% to 50 at%.

5. A magnetic recording medium according to claim 1 or 2, wherein the Cr-Ti-based alloy has a Ti content falling within a range of 25 at% to 50 at%.

6. A magnetic recording medium according to claim 1 or 2, wherein the Cr-Zr-based alloy has a Zr content falling within a range of 25 at% to 50 at%.

7. A magnetic recording medium according to claim 1 or 2, wherein the Cr-Hf-based alloy has an Hf content falling within a range of 25 at% to 50 at%.

8. A magnetic recording medium according to claim 1 or 2, wherein the Co-W-based alloy has a W content falling within a range of 30 at% to 50 at%.

9. A magnetic recording medium according to claim 1 or 2, wherein the Co-W-B-based alloy has a W content falling within a range of 30 at% to 50 at%, and a B content of 5 at% or less.

10. A magnetic recording medium according to claim 1 or 2, wherein the Co-Mo-based alloy has an Mo content falling within a range of 30 at% to 50 at%.

11. A magnetic recording medium according to claim 1 or 2, wherein the Co-Mo-B-based alloy has an Mo content falling within a range of 30 at% to 50 at%, and a B content of 5 at% or less.

12. A magnetic recording medium according to claim 1 or 2, wherein, in the Co-W-Mo-based alloy, the total amount of W and Mo falls within a range of 30 at% to 50 at%.

13. A magnetic recording medium according to claim 1 or 2, wherein, in the Co-W-Mo-B-based alloy, the total amount of W and Mo falls within a range of 30 at% to 50 at%, and the B content is 5 at% or less.

14. A magnetic recording medium according to claim 1 or 2, wherein the non-magnetic substrate is formed of glass or silicon.

15. A magnetic recording medium according to claim 1 or 2, wherein the magnetic layer is formed of at least one material selected from among a Co-Cr-Ta based alloy, Co-Cr-Pt-based alloy, a Co-Cr-Pt-Ta-based alloy, a Co-Cr-Pt-B-based alloy, and a Co-Cr-Pt-B-Y-based alloy, wherein Y is Ta or Cu.

16. A process for producing a magnetic recording medium as recited in claim 1 or 2, comprising a step of forming layer A, layer B, and layer C in this order, and a step of exposing the surface of the thus-formed layer B to an oxygen atmosphere.

17. A process for producing a magnetic recording medium according to claim 16, wherein, in the step of exposing the surface of the layer

B to an oxygen atmosphere, the pressure of an oxygen gas is regulated so as to fall within a range of  $5 \times 10^{-4}$  Pa to  $5 \times 10^{-2}$  Pa.

18. A magnetic recording medium produced through a production process as recited in claim 16.

19. A magnetic recording and reproducing apparatus comprising a magnetic recording medium as recited in claim 1 or 2, and a magnetic head for recording of data onto the medium and for reproduction of the data therefrom.